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UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
WASHINGTON, D. C.
H. H. BENNETT, CHIEF

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ADVANCE REPORT
on the
SEDIMENTATION SURVEY OF BURNT MILLS RESERVOIR
SILVER SPRING, MARYLAND

February 22 - March 3, 1938

by

Farrell F. Barnes and Carl B. Brown



Sedimentation Studies
Division of Research
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In cooperation with
Maryland Agricultural Experiment Station
College Park, Maryland
J. E. Metzger, Acting Director

ABSTRACT

The sedimentation survey of Burnt Mills Reservoir was made as part of a Nation-wide study of rates and causes of reservoir silting, especially as influenced by soil erosion and land use.

Burnt Mills Reservoir is a channel-type, 181-acre-foot water-supply reservoir about 5 miles north of Washington, D. C., on the Northwest Branch of the Anacostia River. Its drainage basin, 27 square miles in area, is characterized by moderately to steeply rolling topography and silt loam soils developed on granite and schist. The area is now undergoing slight to moderate, and on some fields severe, sheet erosion, but gullies are virtually absent. About half of the area is cultivated, the principal crops being corn and grain, and the remainder is about equally divided between open pasture and woodland. Most of the land in this region has been cultivated during various periods within the last 200 years.

The reservoir sediment is predominantly sandy, ranging from coarse sand in the upper reaches to sandy silt and clay near the dam. The greatest accumulation has occurred in the lower reaches, the average thickness in cross section ranging from 6 to 8 feet in the lower half-mile but rarely exceeding 2 feet in upper reaches. The bulk of the sediment has originated from sheet erosion of the cultivated uplands, although stream-bank erosion has probably furnished much of the coarser sediment.

The survey revealed that 86 acre-feet (13,900 cubic yards) of sediment had accumulated in the reservoir at an average rate of about 28 cubic feet a year per acre of drainage area, entailing a loss of original storage of 6.1 percent per year, or 47.5 percent to the date of survey.

It is concluded (1) that, as sediment is originating mainly from sheet erosion throughout the drainage area, the most feasible method of protecting the reservoir from continued excessive silting is the general application of appropriate soil conservation measures, especially to clean-cultivated areas, and (2) that the unusually high rate of storage depletion in this reservoir is due largely to the exceptionally low ratio of reservoir capacity to watershed area. Careful consideration of these factors in locating and designing storage reservoirs is recommended.

INTRODUCTION

This report is one of a series of advance reports on reservoir-silting investigations made by the Section of Sedimentation Studies, Division of Research, Soil Conservation Service. Each reservoir survey is a part of a Nation-wide study of the condition of American reservoirs with respect to storage reduction by silting. The ultimate objective of these studies is to determine rates and causes of reservoir silting, in order to derive a practical index to (1) the useful-life expectancy of existing or contemplated reservoirs, and (2) differences and changes in regional erosion conditions as influenced both by natural factors and by land use.

Burnt Mills Reservoir was surveyed during the period February 22 to March 3, 1938, by a field party consisting of L. H. Barnes, chief of party, M. P. Connaughton, geologic aide, A. T. Talley, engineering aide, and two temporary assistants. Preliminary arrangements for the survey and a brief examination of the drainage area were made by the writers.

The Soil Conservation Service acknowledges the generous cooperation of officials of the Washington Suburban Sanitary District, particularly Harry R. Hall, chief engineer; N. L. Owings, assistant to chief engineer; J. M. Jester, division engineer in charge of the Burnt Mills filtration plant; and C. O. Wherley, assistant engineer, in planning and completing the survey.

GENERAL INFORMATION

Location (fig. 1):

State: Maryland.

County: Montgomery.

Distance and direction from nearest city: 3 miles north-northeast of Silver Spring, Md.

Drainage and backwater: Northwest Branch, Anacostia River.

Ownership: Washington Suburban Sanitary District.

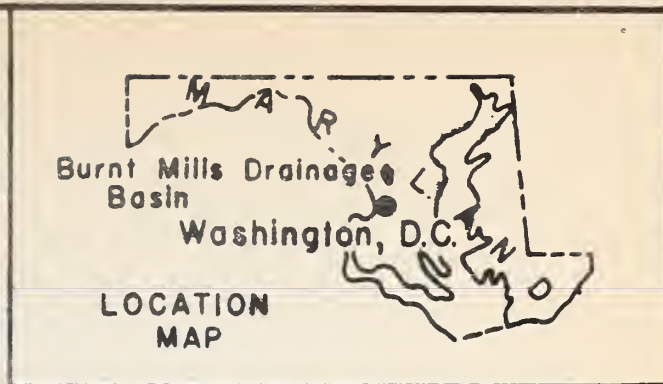


FIGURE 1.- Sketch map of the drainage area of Burnt Mills Reservoir.

Purpose served: Water supply.

Description of dam.

The reservoir is impounded by an Amburson-type concrete dam, 32 feet in maximum height above the stream bed, 215 feet long, and about 60 feet thick at the base. The dam has an ogee-shaped downstream face and a flat upstream face with a slope of about 1:1. It is situated in a narrow, shallow gorge characterized by comparatively steep sides and a flat rock bottom (fig. 2).

The spillway section of the dam is centered over the stream channel and has a crest length of 150 feet. The spillway crest is 23 feet above the lowest part of the stream channel, or 9 feet below the top of the abutment sections of the dam, and is 230.0 feet above mean sea level. The spillway discharge capacity to the 236.5-foot contour (2.5 feet below the top of the abutment sections) is 8,000 cubic feet per second. During about six months of each year (generally April to October) the spillway level is raised by 4-foot automatic wooden flashboards, which are designed to trip when the water level rises 3.3 feet above their tops.

Although the flashboards are in place only about half of each year, for all practical purposes their crest determines the upper limit of available storage space. Therefore, the effective crest level, on which all figures of length, area, and capacity of the reservoir are based, is considered in this report to be determined by the tops of the 4-foot flashboards, at elevation 234 feet.

The total original cost of the reservoir, according to records of the Washington Suburban Sanitary District, was about \$95,000.

Period of storage: Date storage began: May 1930. Average date of survey: March 1938. Age at date of survey: 7.8 years.

Length of lake at crest stage: 1.2 miles. No shortening by sedimentation at the upper end had occurred up to the time of the survey.

<u>Area of lake at crest stage:</u>	<u>Acres</u>
Original.....	20.0
At date of survey.....	<u>19.6</u>
Reduction by sedimentation.....	0.4



Figure 2.--View of Northwest Branch just below Burnt Mills Reservoir, showing character of valley at the dam.



Figure 3.--View of lower part of Burnt Mills Reservoir, showing sand bar or "delta" about 0.5 mile above the dam. Water level at elevation 229.5, or 4.5 feet below top of flashboards.

<u>Storage capacity to crest level:</u>	<u>Acre-feet</u>
Original.....	181 (58,978,850 gals.)
At date of survey.....	95 (30,955,750 gals.)
Loss by sedimentation.....	86 (28,023,100 gals.)

General character of reservoir basin.

The reservoir basin (fig. 4, following page 14) is extremely narrow and sinuous in outline, ranging in width from an average of about 150 feet in the lower half-mile to less than 50 feet in the upper three-fourths mile of its length. The only notable exception to this general outline occurs about 0.5 mile above the dam, where the lake expands abruptly to more than 300 feet in width, maintains this width with little variation for about 600 feet upstream, and then narrows with equal abruptness to less than 40 feet. This wide section includes the only considerable area of flood plain within the limits of the reservoir.

In cross section the basin is typically V-shaped, except in the flood-plain area just described. The valley sides are generally steep, the average slope being more than 40 percent. The original stream channel had a relatively uniform profile and an average gradient of about 21 feet per mile between the dam and the head of backwater.

The capacity-inflow ratio is very low, as indicated by an original storage capacity of only 6.7 acre-feet per square mile of drainage area.

Storage reservoirs in general fall into two distinct categories--namely, basin reservoirs and channel reservoirs--which differ markedly with regard to sedimentation. The distinction between the two types may be illustrated by assuming two reservoirs of equal storage capacity, one of which--the basin reservoir--has a relatively large average cross-section area and in general a large proportion of over-bank storage, and the other--the channel reservoir--has a relatively small average cross-section area and its storage volume largely confined to the original stream channel or narrow valley. It is generally true also that in basin reservoirs the capacity-inflow ratio--approximately indicated by the storage volume per unit of drainage area--is relatively large, whereas in channel reservoirs it is small.

The chief significance of this distinction between the two types of reservoirs lies in the fact that basin reservoirs generally permit practically complete desilting of inflowing waters,

whereas in channel reservoirs the small capacity-inflow ratio, together with the constricted character of the basin, leads to strong through currents in time of flood and consequent bypassage of a large proportion of the sediment load.

From the foregoing it is apparent that Burnt Mills Reservoir, being confined in a generally narrow valley whose sides rise abruptly from the stream channel, and having an exceptionally small capacity-inflow ratio, would most logically be classed as a channel type, even though considerable storage volume lies outside the channel proper. It is therefore to be expected that sedimentation is proceeding in the manner characteristic of channel reservoirs, involving particularly the bypassage of a large part of the incoming sediment.

Area of drainage basin: 27.0 square miles, as planimetered from topographic maps of the Rockville and Laurel quadrangles (scale 1/62,500, U. S. Geol. Survey, 1928 and 1932, respectively).

General character of drainage basin.

Geology.--The area tributary to Burnt Mills Reservoir (fig. 1) lies entirely on the Piedmont Plateau, just northwest of the Fall Line which separates it from the lower-lying Coastal Plain. About 60 percent of the drainage area, including most of the upper half and a smaller area near the reservoir, is underlain by granite, and the remaining 40 percent, mainly along the eastern edge of the area, is underlain by the Wissahickon oligoclase schist, a pre-Cambrian formation consisting of feldspar-mica schists and gneisses and thin layers of quartzite. These formations are generally covered by a soil mantle several feet deep, although the granite crops out on hillsides at several points near the headwaters.

Topography and drainage.--The topography of the drainage basin is that of a moderately to steeply rolling plateau, characterized by a well-developed dendritic drainage system and an average relief of about 100 feet. A few narrow strips of relatively flat upland remain between the larger tributaries and along the encircling divide. The highest point in the drainage area, at Ednor (fig. 1), is 550 feet above mean sea level, or 216 feet above the reservoir. A flood plain, which attains a maximum width of about 1,000 feet near Old Northwest Mills, begins about a mile above the reservoir and extends upstream with varying width into all the larger branches of the main stream. The valley sides generally rise smoothly but with gradually decreasing slope from the stream bottoms to the adjacent uplands.

Soils.--The types and relative extent of soils mapped in the drainage area are as follows:¹

	<u>Percent</u>
Chester loam.....	62.8
Manor loam, micaceous phase.....	26.8
Congaree silt loam (including some Wehadkee silt loam).....	8.5
Conowingo silt loam.....	1.4
Louisa loam.....	.4
Leonardtown silt loam.....	.1
	<hr/> 100.0

The Chester loam is the most productive as well as the most extensive soil in the area. It is a brown to yellowish-brown mellow friable loam, becoming more silty on gentler slopes and richer in mica on steeper slopes. It has developed on Wissahickon gneiss and schist, and to some extent on granite. The surface drainage is good, and the subsoil is retentive of moisture.

The Manor loam, micaceous phase, derived from mica schist of the Wissahickon formation, has a higher mica content and a more porous subsoil than the Chester loam but is otherwise similar in character. Both soils occur on surfaces ranging from gently rolling to hilly, and they are actively eroded on the steeper slopes when not protected by growing crops or other vegetation.

The other soils in the area are much less extensive and not so productive as the Manor and Chester loams. The Conowingo silt loam, derived from dikes of serpentine and related rocks, has a white to light-gray surface soil underlain by a yellow compact, impervious clay subsoil. The Leonardtown silt loam, derived from unconsolidated marine sediments, has a gray to pale-yellow surface soil and a yellow friable subsoil. Both of these types are represented by small areas on broad, undulating divides. The Louisa loam, developed from mica schists, is characterized by a brown to reddish-brown surface soil and a red clay subsoil. It occupies the steeper slopes and in places is being severely eroded. The Congaree silt loam occurs on the first bottoms along all but the smaller tributaries and lies only 4 to 6 feet above normal water level. It has a brown surface soil and a brown silt loam to silty clay loam subsoil. About half of the type is forested and the remainder

¹Carter, W. T., and Hull, J. P. D. Soil Survey of Montgomery County, Maryland. U. S. Dept. Agr., Bur. Soils Field Oper. 1914, Rept. 16: 393-427, 1919.

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supports a heavy growth of native grasses. Its chief use is pasture for work and dairy stock. In many places narrow strips of loam or fine sandy loam occur along the stream banks.

Erosion conditions.---Most of the valley slopes, as well as many areas on the more gently rolling uplands, have undergone slight to moderate sheet erosion, and in scattered fields severe to very severe erosion has resulted in exposed patches of subsoil. Very little gully erosion was in evidence at the time of inspection, although rill development on some recently cultivated fields and trenching of a few minor headwater valleys was noticeable. Owing to the virtual absence of gullies large enough to prevent crossing with farm implements, very little of the land can be classed as completely destroyed by erosion. Much of it, however, has been so impoverished through loss of the more fertile topsoil that it has reverted to generally poor-quality woodland or to weed-covered fields retired from cultivation mostly within the last 10 years.

Examination of aerial photographs of the drainage area revealed that the main stream is actively cutting its banks along most of its course from the vicinity of Norwood (fig. 1) to a point 0.5 mile below Old Northwest Mills. Considerable areas of bottom land, mainly in pasture, have already been impaired, in part by being cut away and in part by the deposition of the resulting sandy debris in strips adjacent to the channel and in splays spread across the loops of many small meanders.

The general agricultural history of Montgomery County--which is typical of this section of the Piedmont--indicates that most of the land within the watershed has probably been cleared and cultivated during one or more periods within the last 200 years. The relatively large proportion of idle land and land reverting to timber so near the Washington, D. C., metropolitan area, suggests that loss of soil fertility through erosion has been one of the principal causes of decline of cultivation in the area.

Land use.---In the absence of accurate figures on land use, the following estimates of the proportionate areas devoted to various uses were made from rough measurements of aerial photographs taken in 1937 and 1938, and checked by a brief examination of the drainage area in the summer of 1938:

	<u>Percent</u>
Cultivated land:	
Corn.....	23
Wheat.....	23
Miscellaneous (clover, truck, etc.).....	<u>7</u>
Total.....	53
Pasture and idle land.....	22
Woodland.....	<u>25</u>
Total drainage area.....	100

In general, cultivated areas are confined principally to the uplands, and wooded areas to the valley slopes, although many patches of woods remain on the uplands and some fairly steep slopes are cultivated. Pasture and idle land are confined to no particular type of topography, but occur on slopes as well as relatively flat uplands, and on practically all the stream bottoms.

Mean annual rainfall: 38 inches at the United States Weather Bureau station at Great Falls, about 12 miles west of the drainage area.

Draft on reservoir.

The average draft is about 4,000,000 gallons per day. During the season of maximum water use (June-September) the average draft is about 6,000,000 gallons per day. Water is supplied to a population of 75,000 to 100,000, and to a few small industries, principally laundries.

METHOD OF SURVEY

The original capacity and the volume of sediment in Burnt Mills Reservoir were determined by the range method of survey.² Horizontal control for mapping the shore line and locating ranges consisted of a series of 11 plane-table stations extending from the dam to the head of backwater. These stations were located by stadia, since the configuration of the basin made triangulation

²Eakin, H. M. Silting of Reservoirs. U. S. Dept. Agr. Tech. Bull. 524: 25-28, 129-135, 1936.

impracticable; however, care was taken to locate each station, wherever possible, so that its position could be checked by backsighting on two or more established points. Vertical control was provided by running a line of checked levels from the dam to the head of the lake. The shore line determined by the top of the flashboards (el. 234) was mapped by plane table and telescopic alidade on a scale of 1 inch to 100 feet.

For the measurement of sediment thickness and water depth, 25 ranges were established across the main channel at intervals of 300 to 500 feet (somewhat longer in the narrow upper reaches), and across the mouths of the principal tributary arms. Water depths were measured with standard sounding apparatus, and most of the sediment depths were measured with an Iwan soil auger on exposed deposits and with a spiral soil auger below the water surface, which was 4 feet or more below the crest of the flashboards during the survey. The 10-foot silt-sampling spud designed by Eakin was used only at a few points in the lower part of the basin, its use elsewhere being precluded either by excessive depth of sediment or by the sandy texture which limited penetration to a few feet.

Distinctions between reservoir sediment and the underlying alluvium and soils were readily made by means of major differences in character. The reservoir sediment, regardless of its texture, was invariably much less compact than the underlying material, which was of three general types: (1) Coarse sand, gravel, and boulders in the original channel, (2) tight sandy clay soil on the submerged valley slopes, and (3) compact alluvial silt on the few small flood-plain areas. The flood-plain deposits were similar in texture to some of the reservoir deposits but were readily distinguished by their greater resistance to penetration with the sediment-measuring apparatus.

As a basis for future resurveys of the reservoir, all range ends were permanently marked with standard SCS bronze tablets, which were stamped with the range-end numbers and set in concrete bases. It will thus be possible to resound the same ranges to check future sedimentation in the reservoir.

SEDIMENT DEPOSITS

Character of Sediment

The deposits in Burnt Mills Reservoir consist almost entirely of sandy sediment. Sand-free silt and clay occur only in segments 1 and 2, immediately above the dam, and even here the most recent deposits are somewhat sandy, an indication of the

progressive filling which tends to bring coarse sediment farther and farther down the reservoir. The sediment in general is highly micaceous and contains an abundance of organic matter, mostly leaves. It ranges in color from yellowish brown to brownish gray, and in texture from coarse sand at the head of deposition in segment 21 (fig. 4, following p. 14) to sandy silt and clay in the lower reaches. The average grain size decreases very uniformly downstream as far as segment 4, in which there is a comparatively abrupt change from silty sand to slightly sandy silt and clay. Above segment 21 the only deposits are coarse sand, gravel, and boulders overlying slabs and ledges of bedrock. As these deposits are identical with normal stream deposits elsewhere in the drainage basin they were not considered as reservoir fill.

Distribution of Sediment

The distribution of sediment in Burnt Mills Reservoir is characterized by a marked concentration in the lower part of the basin. About 53 acre-feet of sediment, more than 60 percent of the total deposit, lies in the lower fourth of the 1.2 miles of back-water.

The average sediment depth, computed by dividing the lake width into the cross-section area of the deposit on each range, attains a maximum of nearly 8 feet on ranges R9-R10 and R11-R12, from which it decreases downstream to less than 6 feet just above the dam. Upstream from these ranges it decreases rather uniformly to less than 2 feet on range R21-R22, above which it varies between 1 and 3 feet to the head of deposition in segment 21 (fig. 5). As the average depth is a function of both the lake width and the cross-section area of the deposit, curves showing the magnitude of these factors on the various ranges are included in figure 5, so that the relative importance of each in determining the average depth may be readily observed.

The finer sediment in the lower four segments occurs as bottom-set beds which are thickest over the deepest part of the cross section but whose surface otherwise conforms generally to the original bottom. Above range R5-R6 the deposits become at once coarser in texture and more irregular in distribution. Between ranges R7-R8 and R11-R12 occurs the nearest approach to a typical delta to be found in the reservoir. In this area, which includes deposits more than 13 feet in maximum thickness, a tongue of sandy sediment (fig. 3), whose nearly flat surface rises slightly above the 230-foot level, extends along the axis of the basin through segments 9 and 8, and then drops off rather abruptly in segment 5 to the level of the bottom-set beds in the lower basin. Above

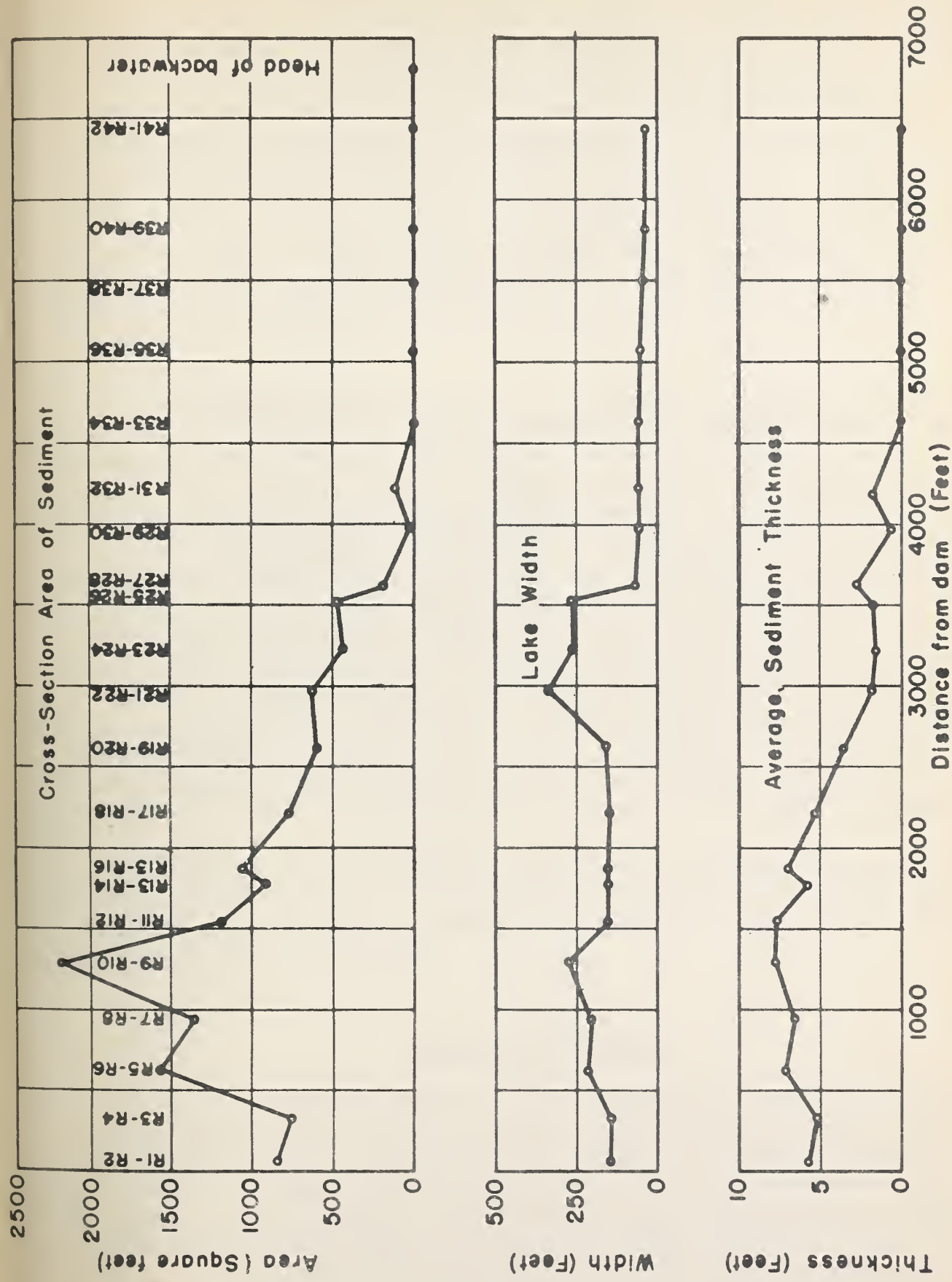


Figure 5.— Curves showing cross-section area of sediment, lake width, and average sediment thickness on ranges across the main channel of Burnt Mills Reservoir.

range R11-R12 all semblance of a delta, other than the sandy texture of the sediment, disappears. In many reaches the deposits resemble those in the lower basin in cross section, being thickest over the channel but otherwise conforming to the original bottom. At other points, particularly in the reentrants at the mouths of tributaries and on the inside of bends, lateral deposits have accumulated in considerable thickness at or near crest level. In the broad submerged flood-plain area of segments 13, 15, and 16 long, narrow bars or natural levees adjacent to the submerged channel have been built up several feet higher than the flood plain (fig. 6). One of these levees extends above the 234-foot level and appears on the reservoir map (fig. 4). The lateral distribution of sediment in this area is illustrated by the cross sections in figure 7.

The general distribution of sediment in Burnt Mills Reservoir well illustrates a tendency toward the reestablishment of a normal alluvial channel, by filling in of reentrants and in general reducing the channel to its original width and cross section, and by an adjustment of the longitudinal profile to conform with the new base level created by the dam. It is apparent from a study of the profiles and cross sections of the basin that the distribution of sediment is more closely related to the lower (230-foot) crest level than to the higher (234-foot) crest level formed by the flashboards. This is to be expected, because all sediment deposited in or near the channel above the 230-foot level during a high-crest period is subject to normal stream action and further transportation as soon as the crest is lowered. On the other hand, lateral deposits and deposits on the flood plain appear to be subject to little or no redistribution during low-crest periods.

Because of the channel character, and particularly the low capacity-inflow ratio, of the basin, a large but indeterminate amount of sediment passes entirely through the lake and over the spillway during each flood.

Origin of Sediment

The sediment in Burnt Mills Reservoir traces back to the loam and silt loam soils of the drainage area, and ultimately to the granite, gneiss, and schist formations from which the soils have been developed. Quartz and mica, the most characteristic minerals in the sediment, are common to all the geologic formations, as well as to most of the soil types, and so are not diagnostic. Consequently the character of the reservoir sediment offers no ready clue as to whether any particular area, formation, or soil type may have been a predominant source of erosional debris.



Figure 6.--View of the flood-plain area of Burnt Mills Reservoir, showing the silted back-channel and the prominent natural levees bordering the channel. Compare the cross section of range R21-R22 (fig. 7), which extends across the tip of the levee in the center of the view.

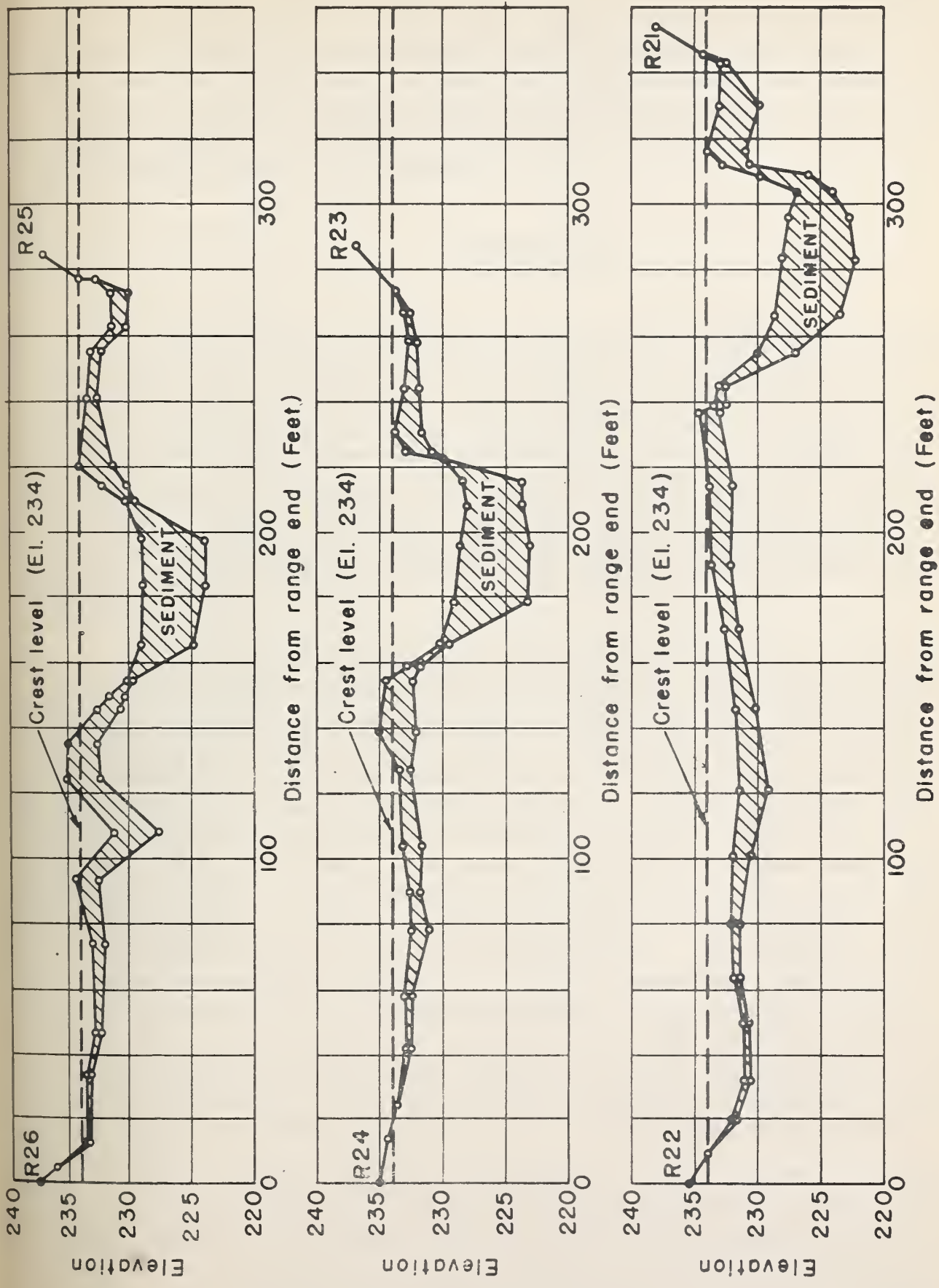


Figure 7.— Cross sections of Burnt Mills Reservoir on ranges R21-R22, R23-R24, and R25-R26 showing lateral distribution of sediment in the flood-plain area.

Observations in the drainage area indicate that widespread sheet erosion, most severe on the steeper cultivated slopes but in general rather uniform over the area as a whole, is responsible for the greater part of the reservoir sediment. A considerable volume, however, has doubtless originated from bank erosion that has occurred extensively along the main stream. The common association of sand overwash with bank cutting noted on aerial photographs suggests that bank erosion may account for a large part of the coarser reservoir sediment.

CONCLUSIONS

The detailed sedimentation survey of Burnt Mills Reservoir has shown that sediment has accumulated at an average rate of 11 acre-feet per year, which is equivalent to nearly 28 cubic feet per acre of drainage area. The corresponding loss of original storage capacity has been more than 6 percent per year. Although the indicated rate of erosion is only moderate, agreeing with observed conditions in the drainage area, the rate of storage depletion is among the highest that have been determined by sediment measurements in more than 80 reservoirs in various parts of the United States.

The unusually high rate of storage depletion is unquestionably due in large part to the exceptionally small ratio between storage capacity and area of the drainage basin. The original storage capacity per square mile of drainage area was only 6.7 acre-feet, the smallest determined for 51 reservoirs surveyed by the Soil Conservation Service, of which only 15 had less than 50 acre-feet per square mile. It has been well established by these surveys that, as the size of the reservoir decreases (assuming a drainage area of constant size and character), the actual volume of sediment deposited also decreases (owing to less complete desilting of inflowing waters) but at a slower rate. For example, reservoir A, with an original capacity of 10,000 acre-feet, may receive 100 acre-feet of sediment per year, representing an annual capacity loss of 1 percent, whereas reservoir B, with an equal drainage area but an original capacity of 5,000 acre-feet, may receive an annual deposit of only 75 acre-feet, which, however, represents a capacity loss of 1.5 percent, an increase of 0.5 percent over reservoir A.

The general tendency, therefore, is for smaller reservoirs to lose their storage capacity at a higher rate than larger reservoirs with the same size and character of drainage basin. In other words, decreasing the initial available storage space more than offsets the tendency for smaller reservoirs to bypass a larger part

of the sediment load. This generalization does not hold, of course, in channel reservoirs on large streams in which the initial capacity is not much greater than the cavity volume of the normal alluvial channel, for in such reservoirs the scouring action of currents that persist through the narrow basin tends not only to prevent deposition but also, especially during floods, to remove deposited material before it has become compacted.

The results of this study of Burnt Mills Reservoir lead to the following conclusions:

First, the general uniformity of erosion conditions over the entire drainage area indicates that effective reduction of erosion and sedimentation can be accomplished only by the general application of appropriate soil conservation measures to the entire drainage area, and especially to those parts devoted to clean-tilled crops. There are apparently few loci of exceptionally severe erosion whose local treatment would effect a proportionately large reduction in the total erosional output. It is probable that a considerable decrease in sediment production could be obtained through measures to eliminate bank erosion along certain reaches of the larger streams. However, as the bottom lands along these reaches are of relatively low value, being dominantly in pasture, the benefits from such measures would accrue largely to the reservoir owners. In contrast, the benefits of erosion control on cultivated upland areas would be shared by land and reservoir owners alike. Other sediment sources that should not be overlooked in any soil conservation program are the roadside ditches and banks along the many farm roads and highways that traverse the area.

Secondly, the unusually high rate of storage depletion in Burnt Mills Reservoir is due in large part to the exceptionally small ratio of reservoir capacity to area of the drainage basin. The history of this reservoir emphasizes the importance of considering this factor when deciding upon the location and capacity of proposed reservoirs, particularly those designed to provide considerable storage for emergency use over and above the normal-flow supply.

The quantitative results of the sedimentation survey of Burnt Mills Reservoir are summarized in the tabulation on the following page.

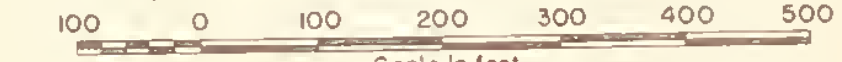
Summary of data on Burnt Mills Reservoir, Silver Spring, Md.

	<u>Quantity</u>	<u>Unit</u>
<u>Age</u> ¹	7.8	Years
<u>Watershed area</u> ²	27.0	Sq. miles
<u>Reservoir:</u> ³		
Area at crest stage:		
Original.....	20.0	Acres
At date of survey.....	19.6	Acres
Storage capacity to crest level:		
Original.....	181	Acre-feet
At date of survey.....	95	Acre-feet
Storage per square mile of drainage area: ²		
Original.....	6.70	Acre-feet
At date of survey.....	3.52	Acre-feet
<u>Sedimentation:</u> ³		
Total sediment.....	86	Acre-feet
Average annual accumulation:		
From entire drainage area.....	11.0	Acre-feet
Per 100 square miles of drainage area ⁴	40.8	Acre-feet
Per acre of drainage: ⁴		
By volume.....	27.83	Cubic feet
By weight (assuming 1 cubic foot of sediment weighs 60 pounds).....	0.83	Ton
<u>Depletion of storage:</u> ³		
Loss of original capacity:		
Per year.....	6.09	Percent
To date of survey.....	47.51	Percent

¹Storage began May 1930; average date of survey, March 1938.²Including area of reservoir.³All figures are based on crest level at top of flashboards (el. 234).⁴Excluding area of reservoir.

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H. H. BENNETT, Chief
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NORTHWEST BRANCH OF ANACOSTIA RIVER
SILVER SPRING
MARYLAND

Sedimentation Survey of Feb. 22 to March 3, 1938
G. C. DOBSON, Acting Head, Sedimentation Studies, Division of Research



- Scale in feet
- LEGEND**
- Spillway Crest at Date of Survey
 - R1 o R2 Silt Range
 - 501 □ Plane-Table Station
 - Area Silted above Original Spillway Crest Line
 - ① Reservoir Segment Number

Leland H. Barnes, In Charge of Field Survey

